11.1 ABRASIVE BLASTING OPERATIONS

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Process Description
Abrasive blasting is the cleaning or preparing of a surface by forcibly propelling a stream of abrasive material against the surface using sand, glassbead, aluminum oxide, grit, slag, garnet, steel shot, slag, walnut shells, and others. Abrasive blasting is being used in many different applications to:

1. remove rust, scale, and paint;
2. roughen surfaces in preparation for bonding, painting or coating;
3. remove burr; and/or
4. develop a matte surface finish.
5. Remove flash from molding operation.

Abrasive blasting helps eliminate the use of organic solvent stripping and the generation of toxic waste material. A wide range of abrasive blasting equipment is available and blasting conditions can be selected to suit the coating and substrate. In most applications, the abrasive media are collected, cleaned to remove coating debris, and reused. The abrasive media breakdown in use so they can not be reused indefinitely. Once the particle size gets smaller, the stripping efficiency drops. The worn abrasive media must be discarded and may require disposal.

There are two types of abrasive blasting:

1. Confined
2. Unconfined

Confined abrasive blasting is abrasive blasting, which is confined in an enclosure to reduce particulate matter emissions to the atmosphere, while unconfined is not. This permit handbook chapter will discuss both types.

A thorough explanation of abrasive blasting is available from Chapter 13.2.6, Abrasive Blasting, of AP-42 (Fifth Edition, Volume I). Generally, a District permit is required for any confined abrasive blasting operation or equipment that has a confined volume greater than or equal to 100 cubic feet and is located in building. If the confined abrasive blasting operation is less than 100 cubic feet, it is exempt from permitting requirements per Regulation 2-1-118.1. In addition, blast cleaning equipment used a suspension of abrasives in water is exempt per Regulation 2-1-118.2. Portable abrasive blasting equipment used on a temporary basis within the District is exempt per Regulation 2-1-118.3.

Completeness Determination
The following District forms should be completed and fees provided for abrasive blasting operations. Use the Completeness Determination Checklist to verify completeness. Use the Data Form Guidance to ensure that the forms are completed correctly. Use the Fee Calculation Guidance to ensure that the fees are calculated accurately.

1. Form 101-B (one for facility).
2. Form G (one per source).
3. If Health Risk Screening is triggered, Form HRSA (one per source).
4. Fees, calculated per Regulation 3 (Schedule F).

Emission Calculations
Particulate matter (PM) and particulate hazardous air pollutants (HAP) are the major concern relative to abrasive blasting. Table 13.2.6-1 in Chapter 13.2.6, Abrasive Blasting, of AP-42 (Fifth Edition, Volume I). Presents total PM emission factors for abrasive blasting as a function of wind speed. However, emissions of PM10 and PM2.5 are not significantly wind dependent.

Emission Factors for Abrasive Blasting

Unconfined and uncontrolled	PM10 = 13 lb/1000 lb of Abrasive
Confined and controlled by fabric filter	PM10 = 0.69 lb/1000 lb of Abrasive

The following equation can be used to calculate daily and annual PM10 emission rates:

$E_{PM10} = U(EF)[1-(A/100)]$

where,

E = emissions of PM10 (lb/hr)
U = blast media usage (lb/day or lb/yr)
EF = emission factor (lb/1000 lb)
A = abatement efficiency (%)

However, an alternative method is to use the grain loading rates and exhaust rates from the particulate abatement devices for confined abrasive blasting operations to calculate particulate emissions.

$E_{PM10} = Q_{dry}(gr)(60\ min/hr)/7000\ gr/lb$

where,

E = emissions of PM10 (lb/hr)
Q_{dry} = dry volumetric flow rate (cfm)
gr = grain loading rate (gr/dscf)

The standard cubic feet of dry air exhaust can be calculated from actual exhaust rates using the following equation:

$Q_{dry} = Q_{act}[(68 + 460)/(Tact + 460)](1-\%H_2O)$

where,

Q_{dry} = dry volumetric flow rate (cfm)
Q_{act} = actual volumetric flow rate (cfm), including water vapor
T_{act} = actual temperature of exhaust (^oF)
$\%H_2O$ = weight fraction of water vapor

AIR TOXICS

According to Chapter 13.2.6, Abrasive Blasting of AP-42, hazardous air pollutants, typically particulate metals, are emitted from some abrasive blasting operations. These emissions are dependent on both the abrasive material and the targeted surfaces. The permit engineer should assume the same percentage of toxics in the resulting emissions of PM10 as found in the abrasive material used.

Applicable Requirements

District Rules and Regulations

In general, the unconfined abrasive blasting operation is subject to the operating standards of Regulation 12, Rule 4. With the proper operation and use of complying abrasive blasting media, the unconfined operation should comply with the operating standards of Regulation 12, Rule 4. Permit conditions are imposed to ensure compliance with Regulation 12, Rule 4.

Confined abrasive blasting operations are subject to the operating standards of Regulation 6**.** Permit conditions are imposed to ensure compliance with Regulation 6.

Best Available Control Technology (BACT)

BACT for the abrasive blasting operations is specified in the BACT/TBACT Workbook. The following are applicable BACT requirements for:

Abrasive Blasting
- Abrasive Blasting - Enclosed

Inform the BACT Coordinator of updates to the BACT/TBACT Workbook.

California Environmental Quality Act (CEQA)
Permit applications which are reviewed following the specific procedures, fixed standards and objective measurements set forth in this chapter (11.5) are classified as ministerial and will accordingly be exempt from CEQA review per Regulation 2-1-311.

In addition to the above-mentioned source-specific applicable requirements, other requirements may also be applicable depending on the facility, its application emissions, and its source location:

- ❑ Offsets
- ❑ Prevention of Significant Deterioration
- ❑ School Notification
- ❑ Risk Screening Analysis

Permit Conditions
Standardized conditions for abrasive blasting operations are available from the Permit Condition Guidance. Refer to the Evaluation Report Template Guidance to obtain the Microsoft Word formatted permit conditions for this source category.